NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

HERBACEOUS WIND BARRIERS

(feet)
CODE 603

DEFINITION

Herbaceous vegetation established in rows or narrow strips across the prevailing wind direction.

PURPOSES

This practice may be applied as part of a conservation management system to support one or more of the following:

- Reduce soil erosion from wind.
- Protect growing crops from damage by wind-borne soil particles.
- Manage snow to increase plant available moisture.
- Provide food and cover for wildlife.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to cropland, or other land where crops are grown. This standard includes the location of herbaceous wind barriers and their management for identified uses. Criteria for the establishment of perennial herbaceous vegetation are in practices standards for establishing permanent vegetation, or in other places in the Field Office Technical Guide. Refer to locally accepted University or extension agronomy guides, or other accepted technical references for criteria to establish annual herbaceous vegetation.

CRITERIA

General Criteria Applicable To All Purposes Named Above

Vegetation:

Barriers may consist of perennial or annual plants, growing or dead. Plant materials shall be selected for the following characteristics:

- Adaptation to the site.
- Erect non-spreading growth habit. Suitable perennial crops include: warm season grasses (Switchgrass, Big Blue Stem, Indiangrass); and cool season grasses (Tall Fescue, Smooth Bromegrass, Timothy). Suitable annual crops include (Cereal Rye or Wheat). These species will also attain the desired density and height for all purposes when seeded at the rates commonly used for forage or grain production.
- Resistant to lodging.
- Good leaf retention.
- Minimum competition with adjacent crops.

Number of Rows:

Barriers may consist of one row of plants, providing the required porosity can be achieved with a single row, and that the row contains no gaps.

Where two or more rows are required to achieve the required porosity and to avoid gaps, the rows shall be spaced no more than 36 inches apart.

Additional Criteria To Reduce Soil Erosion from Wind

Barrier Height:

Barriers designed for this purpose shall have a minimum expected height of 1.5 feet during the wind erosion period for which the barriers are designed (Mid-April through Mid-June).

Barrier Porosity:

Barriers established for this purpose shall be designed to achieve a porosity of 40-50 percent.

Barrier Direction and Spacing:

When barrier direction deviates from perpendicular to the prevailing wind erosion direction, the spacing between barriers shall be correspondingly reduced.

The spacing between barriers shall be measured along the prevailing wind erosion direction during those periods (Mid-April through Mid-June) when wind erosion is expected to occur. Spacing shall not exceed 10 times the expected height of the barrier plus additional width permitted by the soil loss tolerance (T), or other planned soil loss objective.

The effective spacing between barriers shall be determined using current approved wind erosion prediction technology. Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria To Protect Growing Crops From Damage From Wind-borne Soil Particles

Barrier Height:

Barriers designed for this purpose shall have a minimum expected height of 2 feet during those periods (Mid-April through Mid-June) when growing crops are susceptible to damage by blowing wind or wind-borne soil particles.

Barrier Porosity:

Barriers established for this purpose shall be designed to achieve a porosity of 40-50 percent during the period when growing crops are to be protected.

Barrier Direction and Spacing:

When barrier direction deviates from perpendicular to the prevailing wind erosion direction, the spacing between barriers shall be correspondingly reduced.

The spacing between barriers shall be measured along the prevailing wind erosion direction during those periods (Mid-April through Mid-June) when sensitive crops are susceptible to damage by wind-borne soil particles. Spacing shall not exceed 10 times the expected height of the barrier plus additional width permitted by the crop tolerance to wind erosion. Crop tolerance to wind erosion is the maximum rate (tons/acre) of soil blowing that crop plants can tolerate without significant damage due to abrasion, burial, or desiccation.

The spacing between barriers shall be determined using current approved wind erosion prediction technology to estimate wind erosion during specific crop stage periods. Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria To Manage Snow To Retain Additional Soil Moisture

Barrier Height:

Barriers designed for this purpose shall have a minimum expected height of 1.5 feet during periods of expected snow cover.

Barrier Porosity:

Barriers established for this purpose shall be designed to achieve a porosity of 60-75 percent during periods of expected snow cover.

Barrier Direction and Spacing:

When barrier direction deviates from perpendicular to the prevailing wind direction, the spacing between barriers shall be correspondingly reduced.

The effective spacing shall be measured along the direction of prevailing winds during periods

of expected snow cover (December through March). For uniform distribution of drifting snow, spacing shall not exceed 12 times the expected height of the barrier.

Additional Criteria To Provide Food and Cover For Wildlife

Vegetation:

Barriers established for this purpose shall consist of plants that provide food and cover for the targeted wildlife species.

Barrier Width:

Barriers established for this purpose shall have a minimum width of two feet.

Barrier Height:

Barriers established for this purpose shall have a minimum expected height that provides adequate cover for the targeted wildlife species.

CONSIDERATIONS

Transport of wind-borne sediment and sediment-borne contaminants offsite are reduced by this practice when used in a conservation management system.

Herbaceous wind barriers are more suitable than field windbreaks for use under center pivot irrigation systems due to height considerations. Windbreaks may be located outside the windward edge of the circle.

Spacing between barriers may be adjusted, within the limits of the criteria above, to accommodate widths of farm equipment to minimize partial or incomplete passes.

Selection of plants for use in barriers should favor species or varieties tolerant to herbicides used on adjacent crops.

Plants that may be alternate hosts for pests injurious to adjacent crops should not be selected for use in barriers.

Selection of plant species less palatable to animals may reduce damage to barriers from grazing wildlife.

Water erosion from melting snow, accumulated within the barrier system may be a concern. Supporting erosion control practices such as residue management can reduce the hazard. Where feasible, aligning barriers across the slope can enhance moisture infiltration and reduce erosion.

When barriers are designed to enhance wildlife habitat, plant species diversity should be encouraged. The use of evergreens in barriers designed to provide winter cover might increase their value. Barriers that result in multiple structural levels of vegetation within the barrier will maximize wildlife use.

Some plants are damaged by blowing wind as well as by wind-borne soil particles. In such cases, the spacing between wind barriers may have to be reduced from that obtained using wind erosion prediction technology.

PLANS AND SPECIFICATIONS

Specifications for establishment and maintenance of this practice shall be prepared for each field or treatment unit according to the Criteria, Considerations, and Operation & Maintenance described in this standard.

Specifications shall be recorded using approved specification sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation. The minimum required documentation for this practice is outlined on the last page of this standard.

OPERATION AND MAINTENANCE

Annual barriers shall be reestablished each year by planting at recommended dates, leaving rows standing after crop harvest, or leaving standing strips when incorporating a cover crop into the soil.

After establishment, perennial barriers shall be fertilized at the same time and rate as adjacent field crops, or as needed by the barriers. Weeds

shall be controlled with cultivation, mowing, chemicals, or other acceptable methods.

Harvest of hay or seed from perennial barriers, grazing, or mowing for weed control, shall be managed to allow regrowth to the planned height before periods when wind erosion, crop damage, or drifting snow are expected to occur. Annual barriers may be grazed or harvested after critical periods have passed.

Wind-borne sediment accumulated in barriers shall be removed and distributed over the surface of the field as determined appropriate.

Barriers shall be re-established or relocated as needed.

Barriers designed to enhance wildlife habitat should not be mowed or pruned unless their height or width exceeds that required to achieve the wildlife objective, and they become competitive with the adjoining land use. When mowing or pruning is necessary, it shall be done during the non-nesting season (April through July 15th).

REFERENCES

National Standard herbaceous Wind Barriers (422a), June 1994

National Agronomy Manual

Designing Narrow Strip Barriers to Control Wind Erosion, L.J. Hagen, E.L. Skidmore, and J.D. Dickerson; Journal of Soil and Water Conservation - December 1972